What is claimed is:

1. A method for operation of an image-generating optical system for detection of characteristic quantities of the wavelength-dependent behavior of an illuminated specimen, such as the emission behavior and/or absorption behavior and, in particular, the fluorescence and/or luminescence and/or phosphorescence and/or enzyme-active light emission and/or enzyme-active fluorescence, for the operation of a laser scanning microscope, comprising the steps of:

splitting the image point information of the specimen into spectral components in a spatially resolved manner on the detection side in dependence on wavelength; and

carrying out at least one summing for different spectral components.

2. The method according to claim 1 for operation of a scanning system, wherein a change in at least one irradiation wavelength and/or irradiation intensity is carried out within a scanning process between different specimen regions and a summing of at least some of the respective spectral components is carried out for different specimen regions and/or irradiation wavelengths/intensities.

3. The method according to claim 1, wherein the summed regions are displayed as images.

4. The method according to claim 1, wherein a plurality of partial sums is formed and then added.

5. The method according to claim 1, with an overlapping of partial sums of spectral components containing the overlapped signals of different fluorescence components.

6. The method according to claim 1, including the combination with spectral centroid formation for a plurality of spectral components.

7. The method according to claim 1, with mathematical combination such as division and subtraction of partial sums or individual components and graphic representation of the combination.

8. The method according to claim 1, for optical detection of characteristic quantities of the wavelength-dependent behavior of an illuminated specimen, such as the emission behavior and/or absorption behavior, in particular, the fluorescence and/or luminescence and/or phosphorescence and/or enzyme-active light emission and/or enzyme-active fluorescence, wherein the emission radiation is split spectrally by a dispersive element, detected in a spatially resolved manner and at least one sum signal of the emission radiation and/or of the absorbed radiation is determined electronically.

9. The method according to claim 1, wherein the sum signal of the spectrally split emission radiation is determined for distinguishing different dyes and/or for determining the local dye composition of an image point when a plurality of dyes are used simultaneously and/or for determining the local shift of the emission spectrum depending on the local environment to which the dye or dyes is or are attached and/or for measuring emission ratio dyes for determining ion concentrations.

10. The method according to claim 1, wherein the sum signal of the spectrally expanded, reflected, backscattered and/or transmitted excitation radiation of fluorochromes is carried out for distinguishing different dyes and/or for determining the local dye composition of an image point when a plurality of dyes are used simultaneously and/or for determining the local shift in the absorption spectrum depending on the local environment to which the dye or dyes is or are attached and/or for measuring the absorption ratio for determining ion concentrations.

11. The method according to claim 1, wherein the composition of the sum signals can be varied during scanning as a function of the excitation parameters (multitracking).

12. The method according to claim 1, wherein the composition of the sum signals can be varied during scanning as a function of the respective scanning position (ROI tracking).

13. The method according to claim 1, wherein the emission radiation of the specimen is split by a dispersive element and is detected in a spatially resolved manner in at least one direction.

14. The method according to claim 1, wherein a splitting of the fluorescence radiation is carried out.

15. The method according to claim 1, wherein the radiation that is reflected, backscattered and/or transmitted by the specimen is split by a dispersive element and is detected in a spatially resolved manner in at least one direction for absorption measurement.

16. The method according to claim 1, wherein the signals of detection channels are converted and digitally read out and summing is carried out digitally in a computer.

17. The method according to claim 1, wherein the summing is carried out with analog data processing by a demultiplexer in combination with a summing amplifier.

18. The method according to claim 1, wherein the signals of the detector channels are influenced by a nonlinear distortion of the input signals.

19. The method according to claim 1, wherein the integration parameters are influenced.

20. The method according to claim 1, wherein the characteristic or response curve of an amplifier is influenced.

21. The method according to claim 1, wherein the sum signal is used for generating an image.

22. The method according to claim 1, wherein a color-coded fluorescence image is generated.

23. The method according to claim 1, wherein a superposition is carried out with additional images.

24. The method according to claim 1, wherein the sum signals are combined with a lookup table.

25. The method according to claim 1, wherein representation of different dyes and/or the spread of the generated image is carried out by the lookup table.

26. The method according to claim 1, wherein a comparison of the measured signal with a reference signal is carried out via comparators in detection channels and in case the reference signal is not reached and/or is exceeded a change in the operating mode of the detection channel is carried out.

27. The method according to claim 1, wherein the respective detection channel is switched off and/or not taken into account.

28. The method according to claim 27, wherein the spectral region of interest is narrowed in this way.

29. The method according to claim 1, wherein the signals of the detection channels are generated by at least one integrator circuit.

30. The method according to claim 1, wherein the signals of the detection channels are generated by photon counting and subsequent digital-to-analog conversion.

31. The method according to claim 1, wherein the photon counting is carried out in time correlation.

32. The method according to claim 1, for detection of single-photon and/or multiphoton fluorescence and/or fluorescence excited by entangled photons.

33. The method according to claim 1, with parallel illumination and detection, such as in ingredient screening, wherein the specimen is a microtiter plate.

34. The method according to claim 1, incorporated in a microscope.

35. The method according to claim 1, for detection in a nearfield scanning microscope.

36. The method according to claim 1, for detection of a single-photon and/or multiphoton dye fluorescence in a fluorescence-correlated spectroscope.

37. The method according to claim 1, employiing confocal detection.

38. The method according to claim 1, employing a scanning arrangement.

39. The method according to claim 1, employing illumination means with an X-Y scanner.

40. The method according to claim 1, employing an X-Y scan table.

41. The method according to claim 1, employing nonconfocal detection.

42. The method according to claim 1, employing a scanning arrangement.

43. The method according to claim 1, employing descanned detection.

44. The method according to claim 1, employing brightfield imaging.

45. The method according to claim 1, employing point imaging.

46. The method according to claim 1, employing non-descanned detection.

47. The method according to claim 1, employing non-scanning, confocal or nonconfocal detection and point imaging or brightfield imaging.

48. An arrangement for optical detection of characteristic quantities of the wavelength-dependent behavior of an illuminated specimen, such as the emission behavior and/or absorption behavior and, in particular, the fluorescence and/or luminescence and/or phosphorescence and/or enzyme-active light emission and/or enzyme-active fluorescence, comprising:

a dispersive element for splitting the emission radiation spectrally;

a detector for detecting a radiation signal; and

means for electronically determining at least one sum signal of the emission radiation and/or of the absorbed radiation.

49. The arrangement according to claim 48, wherein the sum signal of the spectrally split emission radiation is determined for distinguishing different dyes and/or for determining the local dye composition of an image point when a plurality of dyes are used simultaneously and/or for determining the local shift of the emission spectrum depending on the local environment to which the dye or dyes is or are attached and/or for measuring emission ratio dyes for determining ion concentrations.

50. The arrangement according to claim 48, wherein the sum signal of the spectrally expanded, reflected, backscattered and/or transmitted excitation radiation of fluorochromes is carried out for distinguishing different dyes and/or for determining the local dye composition of an image point when a plurality of dyes are used simultaneously and/or for determining the local shift in the absorption spectrum depending on the local environment to which the dye or dyes is or are attached and/or for measuring the absorption ratio for determining ion concentrations.

51. The arrangement according to claim 1, wherein the composition of the sum signals can be varied during scanning (multitracking).

52. The arrangement according to claim 1, wherein the composition of the sum signals can be varied during scanning (ROI tracking).

53. The arrangement according to claim 1, wherein the emission radiation of the specimen is split by a dispersive element and is detected in a spatially resolved manner in at least one direction.

54. The arrangement according to claim 1, wherein a splitting of the fluorescence radiation is carried out.

55. The arrangement according to claim 1, wherein the radiation that is reflected or transmitted by the specimen is split by a dispersive element and is detected in a spatially resolved manner in at least one direction for absorption measurement.

56. The arrangement according to claim 1, wherein the signals of detection channels are converted and digitally read out and summing is carried out digitally in a computer.

57. The arrangement according to claim 1, wherein the summing is carried out with analog data processing by a demultiplexer in combination with a summing amplifier.

58. The arrangement according to claim 1, wherein the signals of the detector channels are influenced by a nonlinear distortion of the input signals.

59. The arrangement according to claim 1, wherein the integration parameters are influenced.

60. The arrangement according to claim 1, wherein the characteristic or response curve of an amplifier is influenced.

61. The arrangement according to claim 1, wherein the sum signal is used for generating an image.

62. The arrangement according to claim 1, wherein a color-coded fluorescence image is generated.

63. The arrangement according to claim 1, wherein a superposition is carried out with additional images.

64. The arrangement according to claim 1, wherein the sum signals are combined with a lookup table.

65. The arrangement according to claim 1, wherein representation of different dyes and/or the spread of the generated image is carried out by the lookup table.

66. The arrangement according to claim 1, wherein a comparison of the measured signal with a reference signal is carried out via comparators in detection channels and in case the reference signal is not reached and/or is exceeded a change in the operating mode of the detection channel is carried out.

67. The arrangement according to claim 1, wherein the respective detection channel is switched off and/or not taken into account.

68. The arrangement according to claim 67, wherein the spectral region of interest is narrowed in this way.

69. The arrangement according to claim 1, wherein the signals of the detection channels are generated by at least one integrator circuit.

70. The arrangement according to claim 1, wherein the signals of the detection channels are generated by photon counting and subsequent digital-to-analog conversion.

71. The arrangement according to claim 1, wherein the photon counting is carried out in time-correlated manner.

72. The arrangement according to claim 1, for detection of single-photon and/or multiphoton fluorescence and/or fluorescence excited by entangled photons.

73. The arrangement according to claim 1, with parallel illumination and detection, such as in ingredient screening, wherein the specimen is a microtiter plate.

74. The arrangement according to claim 1, incorporated in a microscope.

75. The arrangement according to claim 1, for detection in a nearfield scanning microscope.

76. The arrangement according to claim 1, for detection of a single-photon and/or multiphoton dye fluorescence in a fluorescence-correlated spectroscope.

77. The arrangement according to claim 1, employing confocal detection.

78. The arrangement according to claim 1, employing a scanning arrangement.

79. The arrangement according to claim 1, employing an X-Y scanner in the illumination means.

80. The arrangement according to claim 1, employing an X-Y scan table.

81. The arrangement according to claim 1, employing nonconfocal detection.

82. The arrangement according to claim 1, employing a scanning arrangement.

83. The arrangement according to claim 1, employing descanned detection.

84. The arrangement according to claim 1, employing brightfield imaging.

85. The arrangement according to claim 1, employing point imaging.

86. The arrangement according to claim 1, employing non-descanned detection.

87. The arrangement according to claim 1, employing non-scanning, confocal or nonconfocal detection and point imaging or brightfield imaging.